

A NEW SPECIES OF LAMBDINA, AND NOTES ON
TWO SPECIES OF BESMA (LEPIDOPTERA,
GEOMETRIDÆ, ENNOMINÆ)

BY LAURENCE R. RUPERT

HORSEHEADS, N. Y.

Recent study of various species of the group of the *Geometridæ*, until recently known as the genus *Ellopiæ*, has disclosed an apparently undescribed species of *Lambdina* Capps, and sufficient difference between *Besma quercivoraria* Gn. and *B. endropiaria* G. & R., to warrant retention of both these names at specific rank. A description of the new species and notes on the other two follow.

Lambdina canitiaria new species

Similar to *athasaria* Wlk., in shape, color, and maculation of wings; head dark gray, showing no trace of the yellow that is so conspicuous in *athasaria*; thorax and abdomen dark gray, much less yellow than in *athasaria*; male antennæ more narrowly pectinate than in *athasaria*. (The longest pectinations are about 1 mm. long, while in *athasaria* they average $1\frac{3}{4}$ –2 mm. long.) Male genitalia similar to those of *athasaria* but with slight differences which may not prove constant when a longer series of *canitiaria* is available. I have examined the genitalia of two males of *canitiaria*, and of twelve males of *athasaria*. The *canitiaria* genitalia both differ from any *athasaria* examined and from the figures shown by Capps (Proc. U. S. N. M., Vol. 93, Plate 3), in having (1) finer and shorter spinules on the furca, and fewer of them along the basal third; (2) the terminal part of the furca wider and more rounded; and (3) the auger-like process at the end of the ædeagus less prominent.

Wing expanse 1–1 $\frac{1}{4}$ inches, averaging a little smaller than *athasaria*.

At Horseheads, N. Y., the only locality from which it is known, *canitiaria* is the earliest *Lambdina* to appear in the spring. It is on the wing about three weeks earlier than *athasaria* and the periods of flight of the two species have not been observed to overlap in the same season.

Holotype.—♂, Horseheads, N. Y.—May 22, 1940. (In Franclemont collection.)

Allotype.—♀, Horseheads, N. Y.—May 4, 1938. (In Rupert coll.)

Paratypes.—3 ♂♂, Horseheads, N. Y.—May 22, 1940, and May 9, 1943. (In Rupert coll.)

Besma quercivoraria Gn.—Two females were taken at Horseheads in May 1943. Eggs were obtained from both, and larvæ from both lots were raised to maturity. No differences of note were observed among the eggs, larvæ, and pupæ of the two lots.

The eggs were elliptical, with the surface finely and evenly pitted, at first translucent, almost colorless, but with a faint greenish tinge, which soon became darker and more distinctly green.

The young larvæ were pale yellow green, very slender and very active. They accepted as food several species of oak, but refused everything else offered including maple. Beech was not readily available, and was not offered at this time. On June 22, when most of the larvæ were in the last stage, I left Horseheads to spend several weeks at Sardinia, N. Y., where oak is difficult to find. The larvæ then accepted beech readily, but still refused maple.

The mature larvæ were dull light yellow-green, with head somewhat mottled with brown; second thoracic segment with two prominent brown lateral warts but no conspicuous dorsal adornment; first, second, third, fifth, and sixth abdominal segments with inconspicuous lateral warts; third and sixth abdominal segments each bearing in addition to the lateral warts two prominent subdorsal warts, those on segment 3 somewhat fused with each other, and with the lateral warts of this segment; other segments without special prominences.

The larvæ pupated in late June and early July, forming pale brown pupæ, with wing cases streaked, and abdomen heavily speckled with dark brown. All of the pupæ produced moths the same season, mostly between July 9 and 25, but with a few stragglers in August, September, and October.

Besma endropiaria G. & R.—A female of this species was taken at Sardinia, N. Y., on June 27, 1943, but only fifteen eggs were obtained. These were similar in size, shape, and surface texture to those of *quercivoraria*, but lacked the green tinge, and showed no color change except the normal darkening just before hatching. They hatched on July 9, the same day that produced the first adult of *quercivoraria* as noted above.

The young larvæ were similar in appearance to those of *quercivoraria*, but the only food they would accept was maple. They refused beech, but were not offered oak since it was not readily available. This preference for maple was not unexpected, for several years ago a single larva which I found upon maple produced a male of this species, which I still have in my collection.

The mature larvæ were either green or brown, with head more uniform brown and less mottled than in *quercivoraria*; second thoracic segment with lateral and subdorsal warts so fused as to form a conspicuous ridge extending completely from one lateral wart to the other; first and second abdominal segments with warts similar to those of *quercivoraria*, and in addition a ventral prominence on the second segment; third abdominal segment with warts similarly placed to those of *quercivoraria*, and similarly fused, but larger; fifth abdominal segment with two well-developed subdorsal warts, somewhat fused with each other, but not with the lateral ones; sixth abdominal segment with warts similar to those of the fifth segment.

Of the thirteen larvæ reared, seven were green with brown warts, similar in color to *quercivoraria* larvæ, while the rest were dull brown with darker brown warts. It is reasonable to suppose that a brown form of the larva of *quercivoraria* may occur.

The larvæ pupated in late August, producing pupæ much darker than those of *quercivoraria*. This color difference may not be constant in large series, however, for it has been noted that among certain other *Geometridæ* the pupæ as well as the larvæ exhibit two or more color phases. These pupæ produced no moths until the following season. The failure of *endropiaria* to produce two generations a season is in accordance with the results of field collecting at Ithaca, Horseheads, and Sardinia, N. Y. (Franelemont and Rupert), and at Chicago, Ill. (Wyatt). At Ithaca, Horseheads, and Chicago both species occur, with *endropiaria* flying between the two broods of *quercivoraria*. At Sardinia *endropiaria* flies in June and *quercivoraria* has never been taken.

In addition to the differences noted above between these two species, there appears to be a constant difference in the male antennæ. This was first called to my attention by Dr. Forbes,

and I have since confirmed his observation by examining all the males of both species in my collection. In *quercivoraria* the length of the pectinations shows a very gradual increase from each segment to the next from the base of the antenna, while in *endropiaria* this increase is more abrupt. Likewise the decrease in length of pectinations near the tip is correspondingly gradual in *quercivoraria* and abrupt in *endropiaria*. In general the pectinations are slightly shorter even at the middle of the antennæ in *quercivoraria*.

Considering altogether the differences found between these two species in egg, larval structure and food, period of flight and number of generations a year, and structure of male antennæ, along with the well-known differences in the appearance of the adults, it seems quite reasonable to consider them distinct species, even though the genitalia show no obvious differences. It is true, as Mr. Capps points out (Proc. U. S. N. M., Vol. 93, p. 142), that apparent intergrades occur. However, if only one species is involved, it would seem that such intergrades should be more commonly found than they are in localities where the typical forms are both abundant. Intermediate specimens have never been taken at Horseheads, nor, so far as I can discover, at Ithaca, where intensive collecting over a period of many years has produced large series of both regular forms.

PLATE XI

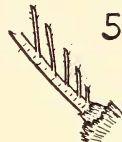
- Figure 1. *Besma quercivoraria* Gn. Larva.
Figure 2. *Besma endropiaria* G. & R. Larva.
Figure 3. *Lambdina canitiaria* new species. Furca of male genitalia.
Figure 4. *Lambdina athasaria* Wlk. Furca of male genitalia.
Figure 5. *Besma quercivoraria*. Base of male antenna, showing only the first five pectinations, and only those on one side.
Figure 6. *Besma endropiaria*. Similar view of part of male antenna.



1-QUERCIVORARIA



2-ENDROPIARIA



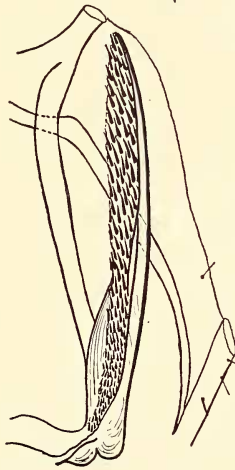
5



6



3-CANITIARIA



4-ATHASARIA